California Outdoor Lighting Standards Synopsis

Background

This document is a synopsis of a project underway by the California Energy Commission to develop standards to regulate the energy use of outdoor lighting in California. The project will address outdoor lighting in both the public and private sector. Public sector lighting includes roadway lighting, traffic signals, parking lots, sports lighting, grounds lighting in parks and playgrounds, and illumination of public monuments and buildings. Private sector lighting includes parking lots, building façade lighting, outdoor sales areas such as garden centers or car lots, service station canopies, soffit lighting, special lighting for ATMs, advertising signs, and billboards.

Outdoor lighting consumes a great deal of electricity and can be a significant contribution to peak electricity demand, especially when it is improperly controlled. Through legislation adopted in 2001 the Commission has been authorized to establish energy efficiency standards for outdoor lighting to save energy and reduce electricity peak demand.

It is important to note that poorly designed outdoor lighting can cause environmental impacts resulting in community and social problems, such as light trespass and light pollution, as discussed below.

- Light trespass is unwanted light from a neighboring property. It is a growing concern in many communities, as sources of outdoor lighting have become more intense. Any source of light can create trespass, but complaints are related mostly to sports lighting, billboards, and street lighting. Light trespass is annoying, but it can also be a serious nuisance or even a serious health and safety risk if it adversely affects visibility for other tasks. Light trespass may also be a source of glare, including disabling, discomfort, veiling luminance, and annoyance glare that can also be serious public health and safety risk.
- Light pollution is outdoor lighting that is directed or reflected to the sky. It creates sky glow that inhibits visibility of stars and changes the whole character of the night sky. With sky glow, low clouds appear light in color. Without light pollution, low clouds would appear dark. Light pollution also reduces the effectiveness of observatories located near cities. Satellite photographs at night reveal the outline of the entire continental United States and all urban centers are clearly visible.

In adopting energy efficiency standards for outdoor lighting, the Commission will consider the implications of energy efficiency improvements on these issues. The Commission will consider outdoor lighting improvements that cost effectively save energy and/or reduce peak demand, and also either reduce or avoid increasing light trespass and light pollution.

The *Advanced Lighting Guidelines*[1] have more information on light trespass (§3.2.4) and light pollution (§3.2.5). The *Advanced Lighting Guidelines* also contain other information pertinent to this project, including §4.3.1, Light Distribution: Advanced Guideline-Light Pollution and Light Trespass; §4.4.2 Lighting Analysis Tools-Exterior Lighting Calculations; §5.9, Exterior-Gas Stations; and §7.6, Outdoor Luminaires.

Project Goal

The goal of the project is to conserve energy and reduce electricity peak demand by adopting cost effective energy efficiency standards for outdoor lighting consistent with public health and safety.

In adopting cost effective energy efficiency standards for outdoor lighting, the Commission anticipates that these Standards will also improve the quality of outdoor lighting. Also, to the extent that these measures are cost effective, the Commission expects that the Standards may reduce the impacts of poor outdoor lighting systems, such as light trespass, excessive illumination, poor uniformity, glare, and poor visibility. In addition, the Commission anticipates that persons complying with the Standards will learn about effective outdoor lighting technologies and techniques, through guidance information that the project produces to aid compliance.

The Legislative Mandate

In response to the California energy crisis, the California Legislature passed and Governor Davis signed Senate Bill 5X (Statutes of 2001), which requires the California Energy Commission to adopt energy efficiency standards for outdoor lighting. SB 5X added the following section to the Public Resources Code:

> *25402.5 (3) (c) The Commission shall adopt efficiency standards for outdoor lighting. The standards shall be technologically feasible and cost-effective. As used in this subdivision, "outdoor lighting" refers to all electrical lighting that is not subject to standards adopted pursuant to Section 25402, and includes, but is not limited to, street lights, traffic lights, parking lot lighting, and billboard lighting. The Commission shall consult with the Department of Transportation (CALTRANS) to ensure that outdoor lighting standards that affect CALTRANS are compatible with the department's policies and standards for safety and illumination levels on state highways.*

Through this project, the Commission intends to develop and adopt lighting standards for all outdoor lighting applications, including all non-conditioned areas that are not already subject to existing California Standards. Such lighting includes but is not limited to lighting in unconditioned buildings, lighting that is mounted on the exterior of buildings, lighting that is exterior to buildings but controlled from the electrical panel of the building, and lighting that is not controlled from a building. Examples of outdoor lighting include lighting in unconditioned warehouses and other unconditioned building spaces,

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[1] The *Advanced Lighting Guidelines* is a publication sponsored by the California Energy Commission and others. The document is in its third edition and is available from the www.NewBuildings.org and from other sources.

lighting for parking lots, signage and advertising, car lots, and service stations, street and highway lighting and other outdoor lighting systems.

Some outdoor lighting may currently be regulated in the California Electrical Code, the California Fire Code, or in other rules of state and local government agencies. The Commission intends to develop standards that may be appropriately adopted in the California Energy Code (Title 24, Part 6) or in other Parts of Title 24 or other rules adopted by state or local government agencies.

The Commission has targeted July 1, 2003 for adoption of these new California Outdoor Lighting Standards. Those portions of these Standards that are adopted in Title 24 are expected to go into effect in conjunction with the 2005 California Building Code, expected to become mandatory in 2005. Between the 2003 adoption date and the 2005 effective date, the Commission anticipates that the California utilities will focus Public Goods Charge-funded programs on providing a transition process for early, voluntary compliance with the new Standards.

Existing Outdoor Lighting Regulations

California Standards

California has had energy efficiency standards for new buildings since 1978, but these standards apply to exterior lighting in only a limited way. For nonresidential and high-rise residential buildings and hotels/motels, §130 (c) of the Standards requires that lamps rated greater than 100 watts have an efficacy of at least 60 lumens per watt, but there are a number of exceptions to the requirement. §130 (f) requires that all permanently installed exterior lighting powered by the building electrical service be controlled by either a photocell or astronomical time switch. The California Standards currently only apply when this exterior lighting is connected to the electric system of a building that is covered by the Standards. The current Standards do not apply to the types of outdoor lighting covered by the new legislation.

For nonresidential and high-rise residential buildings and hotels/motels, the Building Energy Efficiency Standards limit the lighting power that can be installed in interior spaces, but the limits only apply to spaces that are conditioned or semiconditioned as defined by the Standards. The Standards do not apply to unconditioned warehouses, unconditioned manufacturing facilities or other unconditioned spaces. Essentially, the current Standards treat these unconditioned interior spaces as outdoor spaces, and exempt them from the lighting power requirements. This project will develop standards for unconditioned spaces, which are presently unregulated.

For low-rise residential buildings, the current Standards address exterior lighting only as an alternative to efficacy requirements for bathrooms in § 150(k)2., Alternative B. A high efficacy luminaire need not be installed in a bathroom if all luminaires providing outdoor lighting have lamps with an efficacy of 40 lumens per watt or higher or are equipped with a motion sensor. This project will consider other Standards requirements for outdoor lighting in low-rise residential buildings.

See

Attachment A

Excerpts from the California Building Energy Efficiency Standards for the specific language in the current Standards for exterior lighting.

Other Standards

ASHRAE/IESNA Standard 90.1-1989 has been adopted for federal buildings and as the energy efficiency standard in many states. This standard has lighting power requirements for a number of outdoor lighting applications, including: building entrances and exits, loading areas, exterior building surfaces, outdoor storage areas, driveways, walkways, parking lots and parking garages. This standard also requires that either photocells or time clocks control outdoor lighting applications (similar to California's Standards). See Attachment B

Excerpts from ASHRAE/IESNA Standard 90.1-1989 User's Manual for more information.

ASHRAE/IESNA Standard 90.1-1999 replaced the 1989 version. This version eliminated the power allowances for parking lots and building grounds and replaced them with efficacy requirements. ASHRAE/IESNA Standard 90.1-1999 still has power limits for building entrances, exits and facades. The current limited requirements for exterior lighting in the California Standard are modeled after the comparable section in the most recent ASHRAE/IESNA standard. See

Attachment C

Excerpts from ASHRAE/IESNA Standard 90.1-1999 User's Manual for more information on this standard.

The Process

The Commission has entered into a contract with Eley Associates to assist in developing the new outdoor lighting standards. Subcontractors Benya Lighting Design, Clanton and Associates, Heschong Mahone Group and RLW Analytics will assist Eley Associates. The following describes the major project milestones and provides an approximate date for each. Participants should visit the Commission website to confirm the dates as they become firm.

January 29	The Commission and its contractors will meet to identify possible outdoor lighting measures and to assign responsibility to team members for developing information using the outdoor lighting template.
February 1	Commission announces its website on outdoor lighting and posts a template for the public to use in suggesting outdoor lighting standards. This synopsis will also be posted.
February 28	Proposed standards ideas will be posted on the Commission website. These will include those developed by the Commission and its contractors as well as those developed by other interested parties.
March 27	A public workshop will be held in Sacramento to discuss the proposed outdoor lighting standards ideas and to receive comment from all interested parties.
Mid May	Research reports developed by the Commission and its contractor team will be posted on the Commission website. These documents will contain recommended standards for outdoor lighting and supporting data on the technical feasibility and life cycle cost of the proposed measures.
Late May	A public workshop will be held in Sacramento to discuss the research reports and the recommended standards.
July	A draft standard will be developed, which incorporates the recommendations developed in the research report with consideration of input received at the public workshops.

How to Participate

The Commission encourages the public and interested parties to participate in the process. If you want to suggest a new Standard or Standards change, you should download the template from the Commission website and submit your proposal by the end of February. If you want to participate in the public workshops, consult the Commission website for exact dates and plan to participate. In

order to prepare for the workshops, you should download and read the relevant materials from the Commission website.

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Attachment A

Excerpts from the California Building Energy Efficiency Standards

Section 130 (c) Exterior Building Lighting. All permanently installed exterior luminaires attached to or powered by the electrical service in buildings that contain conditioned space(s), and employing lamps rated over 100 watts shall either: have a source efficacy, determined by dividing the rated initial lamp lumens by the rated lamp watts, of at least 60 lumens per watt; or be controlled by a motion sensor.

EXCEPTION 1 to Section 130 (c): Lighting required by a health or life safety statute, ordinance, or regulation, including but not limited to, emergency lighting.

EXCEPTION 2 to Section 130 (c): Lighting that is integral to advertising signage.

EXCEPTION 3 to Section 130 (c): Lighting used in or around swimming pools, water features, or other locations subject to Article 680 of the 1998 California Electrical Code

EXCEPTION 4 to Section 130 (c): Searchlights and lighting for use in theme parks.

EXCEPTION 5 to Section 130 (c): Outdoor theatrical equipment, provided it is for temporary or periodic use and is not for continuous use.

§131 (f) Exterior Lighting. All permanently installed exterior lighting attached to or powered by the electrical service in buildings that contain conditioned space(s) shall be controlled by a directional photocell or astronomical time switch that automatically turns off the exterior lighting when daylight is available.

EXCEPTION to Section 131 (f): Lighting in parking garages, tunnels, and large covered areas that require illumination during daylight hours.

ALTERNATIVE TO §150 (k)2. A high-efficacy luminaire need not be installed in a bathroom if:

…

B. All luminaries permanently mounted to the residence providing outdoor lighting shall be installed with the following characteristics:

(1) Luminaires with lamps with 40 lumens per watt or greater; or

(2) Luminaires with lamps with an efficacy of less than 40 watts lumens per watt shall be equipped with a motion sensor.

Attachment B

Excerpts from ASHRAE/IESNA Standard 90.1-1989 User's Manual

Exterior Lighting Controls (§6.4.2.8)

With the exception of exterior lighting designed for 24-hour operation, all exterior lighting shall be controlled by photocells, time switches or a combination of the two. Time switches must be seven-day, astronomical (or have some means of seasonal compensation). There must also be a power backup to enable accurate time keeping through a minimum four-hour power loss.

Traditionally, exterior lights have been controlled by electro-mechanical clocks with mechanical trippers which toggle circuit switches. These devices typically are equipped with a manual override. Many of these traditional devices do not have either seasonal correction or four-hour backup and will *not* meet the requirements of §6.4.2.8. The following devices will meet the requirements:

- Seven-day electrically-driven, mechanical clock with trippers, astronomical dial and four-hour spring-wound storage
- Seven-day or calendar year, electronic programmable time switch with astronomic correction and battery backup
- Either of the above with a photocell (in lieu of astronomical correction)

Of these, the last is best since it automatically and continuously compensates for changes in the seasons, and has the redundancy of the timeclock control, which will operate if the photosensor fails.

Exterior Lighting Power (§6.4.1)

Standard 90.1 separates the maximum power requirements for exterior and interior lighting systems. The exterior lighting power allowance (ELPA) is a basic requirement, which must be met in all methods of compliance including the energy cost budget method.

Trade-offs are not permitted between the exterior lighting systems and other building systems, including interior lighting, with any method of compliance. For multibuilding facilities, the exterior lighting power allowance (ELPA) applies to the entire site and trade-offs are permitted between exterior lighting systems on the site.

What is Covered

Most exterior lighting is covered by the Standard including all permanent lighting fixtures intended for lighting the building and its grounds.

Building-Mounted Exterior Lighting. All lighting mounted on the building, less specific exceptions as noted below, is governed. This generally means all lanterns, soffit lights, floodlights, step lights, wall

packs and any decorative lighting such as neon outlining, low-voltage light strips and ornamental pendants and globes.

Grounds, Roads, Parking Lots and Other Exterior Lighting. All lighting on the building site, less specific exceptions as noted below, is governed. This generally includes pole-mounted lighting, landscape lighting, bollards, step lights, wall packs and all other lighting for the roads, walks, parking lots, gardens, trees and other portions of the site. Note that lighting not powered by the building electrical system, such as municipal street lights, is exempt.

Open-air parking lots, rooftop parking and carports are included in the exterior lighting requirements. Covered parking garages are part of the interior lighting requirements and are *not* included with the exterior lighting.

Exempt Exterior Lighting

Section 6 does not regulate lighting over which the designer has little choice or control, as described below. Lighting for safety, security or commercial needs is also exempt. The following are specific lighting applications exempt by the Standard.

Emergency Lights, Exit Signs and Mandatory Safety or Security Lights. If a code or ordinance requires lighting for safety or security, then it is generally exempt. It is *not* exempt if it is used as part of non-mandated lighting as well. An emergency egress light is exempt if it is normally off and switched through life-safety controls; however, if the light also serves as a general light source, it is *not* exempt. Typically exempt lighting also includes exit signs, security lights (such as for automatic teller machines) and other lights required by security or safety officials.

Sign Lights. Both self-contained and external illumination for signs are exempt.

Exterior Lighting. Outdoor lighting for a wide variety of special situations is exempt, including:

- Outdoor Manufacturing, Commercial Greenhouses and Processing Facilities. This in general is meant to exempt outdoor commercial, agricultural and industrial work areas, ranging from nighttime farming activities to refineries.
- Outdoor Athletic Facilities. Lighting for outdoor sports of all kinds is exempt.
- Exterior Lighting for Public Monuments
- Lighting for Dwelling Units. Note that exterior lighting as well as interior lighting for dwelling units is exempt.

Definitions Used with Exterior Lighting Calculations

The allowance for some of these areas involves judgment. The following definitions are provided as a guide:

Exit. A door or group of doors to a building not ordinarily used as an entrance and primarily used as an emergency, nighttime or convenience exit.

Entrance (without canopy). A door or group of doors to a building ordinarily used by tenants or the public to enter the building for normal use or business, but having no ornamental or functional canopy or shelter.

Entrance (with canopy). A door or group of doors to a building with an exterior awning, soffit, canopy or ornamental or functional structure generally signifying a "main" or "proper" entrance to a building. A canopy does not have to be shelter; the major issue here is identification or marketing.

Public Exterior Areas. Public areas are intended to mean those used by the occasional and/or unfamiliar user of the building. For instance, parking and roads for hotels, airports, shopping centers, etc. are "public." Also public are the roads leading to a private building, such as an office building, plus the visitor parking and all walks leading into the main entry.

Private Exterior Areas. Private exterior areas are those whose users are frequent and/or familiar users of the facility. Typical situations include private parking lots and drives to them.

Exterior Lighting Power Allowance

To determine exterior lighting compliance the designer must calculate both the exterior connected lighting power (CLP) of the proposed design and the exterior lighting power allowance (ELPA). Compliance is achieved if the exterior CLP is less than or equal to the ELPA.

The exterior CLP is calculated by summing the exterior lighting power for all luminaires that are included in the scope of the exterior lighting requirements.

The ELPA is calculated by multiplying each lighted area (or length of door opening) by the appropriate exterior lighting power allowance from Table 6-1. This table is repeated as Table 6-B below.

There are three types of measurements used in determining ELPA:

- *Area of Horizontal Area Descriptions.* Typically flat or rolling area of grounds, driveways, lots, gardens or parks are measured from site plans. In general, measure and compute the area as if the site were flat. Sites with extreme topography can be allowed a larger area than the horizontal projection due to the actual area of the land's contours; however, unless a sophisticated and accurate method for determining surface area is used, then the "flat" condition must be assumed. In the case of canopies, the area of the canopy ceiling measured in the flat plane determines the area to be used. Even if the canopy is slanted or peaked inside, the measurement is actually of the ground beneath the canopy.
- *Linear Length of Door Openings.* This value is measured in plan view and includes the door opening only; sidelights and other portions of the door which do not open are not part of the linear length.
- *Area of Building Facades.* The intent is to provide a reasonable allowance to light the exterior of buildings for identification, aesthetic and marketability reasons. This area is the sum of all areas of the building exterior intended to be illuminated. Note that many of the surfaces are not in the vertical plane, such as soffits, overhangs, slants and other geometric shapes. Determining the area of these shapes will involve more complex calculations.

Table 6-C Exterior Lighting Unit Power Allowances

Area Description	Allowances
Exit (with or without canopy)	25 W/lin ft of door opening
Entrance (without canopy)	30 W/lin ft of door opening
Entrance (with canopy)	
High traffic (retail, hotel, airport, theater, etc.)	10 W/ft_ of canopied area
Light traffic (hospital, office, school, etc.)	4 W/ft_ of canopied area
Loading area	0.40 W/ft_
Loading door	20 W/lin ft of door opening
Building exterior surfaces/facades	0.25 W/ft_ of surface area to be illuminated
Storage and non-manufacturing work areas	0.20 W/ft_
Other activity areas for casual use such as picnic grounds, gardens, parks and other landscaped areas	0.10 W/ft_
Private driveways/walkways	0.10 W/ft_
Public driveways/walkways	0.15 W/ft_
Private parking lots	0.12 W/ft_
Public parking lots	0.18 W/ft_
Parking garages[2]	0.20 W/ft_

[2] Parking garages are considered interior lighting under ASHRAE/IESNA Standard 90.1-1989.

Attachment C

Excerpts from ASHRAE/IESNA Standard 90.1-1999 User's Manual

General Information

Exterior lighting equipment has new efficacy requirements. The 1989 Standard contained exterior lighting power requirements for parking lots and building grounds. These requirements have been eliminated. Instead, the new Standard specifies a minimum efficacy (lumens/watt) for outdoor lighting. (Note that parking garages are included in interior lighting.)

Exterior and Interior Lighting Power Trade-Offs. The Standard contains separate requirements for exterior and interior lighting systems. Exterior and interior lighting must comply separately with their respective requirements. Trade-offs between the two are not allowed. Trade-offs are permitted, however, within interior lighting power and within some parts of exterior building lighting power.

Garages and Parking Areas. A covered garage is treated as interior space and is included as part of the interior adjusted lighting power. Open parking lots (including rooftop parking) are not covered by the exterior lighting requirements. However, § 9.2.6 requires an efficacy of at least 60 lumens per watt for open parking lots, which means that metal halide, high-pressure sodium, or efficient fluorescent sources must be used.

Exterior Lighting Control (§ 9.2.1.3)

All exterior lighting shall be automatically switched by photocells, time switches, or a combination of the two. If timers are used, they must be able to account for seasonal differences in the length of the day as it changes throughout the year. Although not required by the Standard, designers should choose timers that are equipped with power backup to allow accurate timekeeping during temporary power outages and to avoid having to reset the timer after such an outage.

Traditionally, exterior lights have been controlled by electro-mechanical clocks with mechanical trippers that toggle circuit switches. These devices typically are equipped with a manual override. Many of these traditional devices do not have seasonal correction. As such, they do not meet the requirements of § 9.2.1.3. The following devices will meet the requirements:

- Photocells
- Seven-day electrically driven mechanical clocks with trippers, astronomical dial, and four-hour spring-wound storage
- Seven-day or calendar-year electronic programmable time switches with astronomic correction and battery backup
- Either of the timers above, with a photocell in place of astronomical correction

Of all these devices, a photocell-time clock combination is the most effective, since its photocell automatically and continuously compensates for changes in the seasons. In addition, the redundancy of the time clock control allows for continued operation if the photocell fails.

Exterior Building Grounds Lighting (§ 9.2.6)

Parking lots, pedestrian walkways, gardens, and other landscaped areas associated with a building must have an efficient lighting system. The Standard requires that all exterior building grounds luminaires that operate at more than 100 watts have an efficacy greater than 60 lumens per watt. The efficacy requirement will eliminate the use of all incandescent and mercury vapor discharge sources greater than 100 watts in exterior building grounds luminaires. Full-size fluorescent, metal halide, high-pressure sodium, and most other high-intensity discharge (HID) lighting sources will have an efficacy greater than 60 lumens per watt. Small luminaires for walkways, exterior stairs, and other applications will typically be smaller than 100 watts and will be exempt from the requirement.

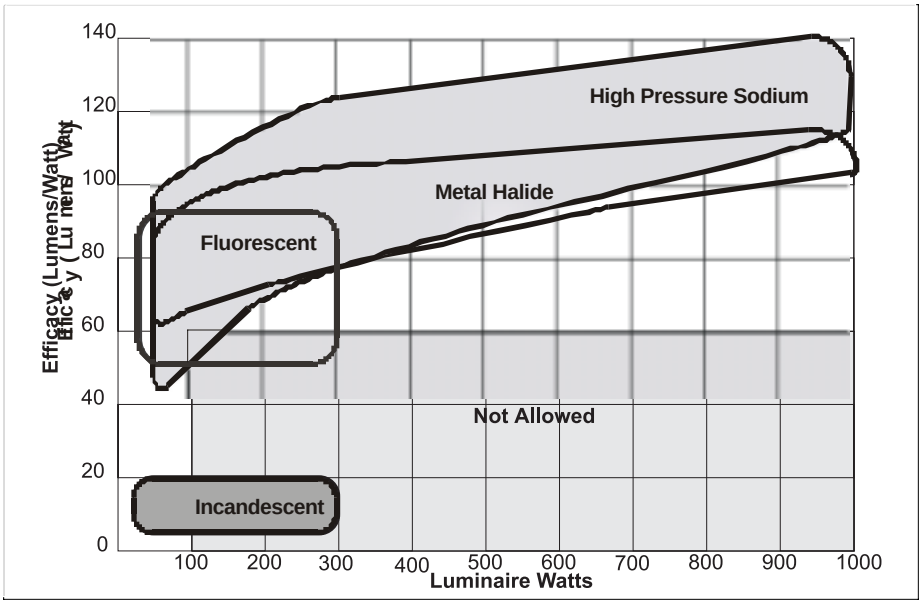

Figure 9-F– Exterior Grounds Lighting and Specific Technologies

Some exterior lighting applications are exempt from the requirement, including traffic signals, lighting within outdoor signs, and lighting used to illuminate public monuments or registered historic landmarks. There is an additional exemption to the lighting efficacy requirement when an occupancy sensor or motion sensor controls the lighting application.

Figure 9-F llustrates the efficacy requirements for exterior grounds lighting and shows the performance of typical luminaires. The horizontal axis shows typical luminaire size. The vertical axis shows source efficacy in lumens per watt. The boundaries of typical available products are shown for high-pressure sodium (HPS) luminaires, metal halide luminaires, incandescent luminaires, and compact fluorescent luminaires. This figure shows that typical high-pressure sodium and metal halide luminaires have an efficacy well above the required 60 lumens per watt. The only HPS luminaires that might not meet the requirement are those with small lamps (just over 100 W). Most fluorescent lamps also meet the requirement, especially those with electronic ballasts. Incandescent luminaires have an efficacy less than 20 lumens per watt; if they are larger than 100 W they would not meet the requirement.

Exterior Building Lighting Power (§ 9.3.2)

This requirement applies to all exterior grounds lighting with luminaires larger than 100 watts, including parking lots, pedestrian walkways, and landscape lighting. In addition, the Standard specifies the maximum exterior lighting power that can be used at building entrances and building exits and to illuminate building façades. The maximum power that can be used for these lighting applications is based on the area of the building façade or width of the entrances. These requirements are shown in Table 9-C, which is the same as Table 9.3.2 in the Standard.

The terms used in Table 9-D are clarified below:

Table 9-D – Lighting Power Limits for Building Exteriors
(This is Table 9.3.2 in the Standard)

Applications	*Power Limits*
Building entrance with canopy or free-standing canopy	3 W/ft^2 (32.4 W/m^2) of canopied area
Building entrance without canopy	33 W/lin ft (108.3 W/lin m) of door width
Building exit	20 W/lin ft (65.6 W/lin m) of door width
Building façades	0.25 W/ft^2 (2.7 W/m^2) of illuminated façade area

- *Building Entrance (with canopy)*. This lighting application refers to a door or group of doors to a building with an exterior awning, soffit, canopy, or other architectural means of sheltering people who are entering or exiting the building. The canopy or awning usually signifies a “main” or “proper” entrance to the building. A canopy does not have to be an actual shelter from the weather; the canopy’s major function is often to identify the building’s entrance or to advertise its owners or tenants. The lighting allowance for this type of entrance is 3 W/ft_ (32.4 W/m_) of canopy area. The canopy area is the horizontal projection of the canopy (e.g., if the canopy slopes, the actual area may be greater than the horizontal projection).
- *Building Entrance (without canopy*). This lighting application refers to a door or group of doors to a building ordinarily used by tenants or the public to enter or exit the building. The distinction is that the entrance in this class does not have a canopy or shelter that extends from the building. The lighting power allowance is 33 W/lin ft (108.3 W/lin m) of entrance width.
- *Building Exit*. A building exit is usually an emergency exit and is not intended as the main entrance to the building. The allowance is 20 W/lin ft (65.6 W/lin m) of entrance width.
- *Building Façade*. Important buildings are often illuminated with exterior luminaires to highlight significant architectural features. The allowance is 0.25 W/ft_ (2.7 W/m_) of building façade. The façade area used to determine the allowance is not the entire façade but rather the portion of the façade that needs to be illuminated.

Certain types of exterior lighting applications are specifically exempt when they are equipped with an independent control. These include the following:

a. Specialized signal, directional, and marker lighting associated with transportation are exempt. These include traffic signals, directional signs, and other similar luminaires.

b. Lighting applications are exempt when they are used to highlight public monuments and registered historic landmark structures or buildings. To qualify as historic, a monument or building must be specifically designated as historically significant by the adopting authority or listed in "The National Register of Historic Places." It may also be exempt if the U.S. Secretary of the Interior determines that the monument or building is eligible for listing in the Register.

c. All lighting within advertising signs is exempt. This includes pole-mounted or building-mounted signs as long as the lighting is integral to the sign. The exemption does not apply to building-mounted signs that are illuminated by luminaires positioned outside the sign and directed toward the sign.

Determining Exterior Building Lighting Power Compliance

Determining whether a building complies with the exterior building lighting power requirements is a two-step process. The first step is to calculate the exterior lighting power allowance (ELPA). The ELPA is calculated by multiplying each lighted area or width of door opening by the appropriate exterior lighting unit power allowance.

The second step is to calculate the exterior connected lighting power (CLP) of the proposed design. The exterior CLP is determined by totaling the exterior lighting power for all proposed exterior luminaires that are not exempt from the exterior lighting requirements. When determining input wattage for luminaires, it is important to include ballast losses for all fluorescent and HID sources. The input wattage tables in the Reference section of this chapter may be used to calculate CLP of specific light sources if luminaire manufacturer data are unavailable.

The project complies with the exterior building lighting requirement if the exterior CLP is less than or equal to the ELPA. Trade-offs are not allowed between the exterior lighting systems and any other building systems, including interior lighting systems. However, for multi-building facilities, the ELPA applies to the entire site. Thus, trade-offs are permitted between different *exterior* lighting systems on the site, provided the total exterior CLP does not exceed the total ELPA.